

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

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MARK SCHEME for the October/November 2014 series

4024 MATHEMATICS (SYLLABUS D)

4024/21

Paper 2, maximum raw mark 100

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Abbreviations

- cao correct answer only
- cso correct solution only
- dep dependent
- ft follow through after error
- isw ignore subsequent working
- oe or equivalent
- SC Special Case
- www without wrong working
- soi seen or implied

Question	Answers	Mark	Part Marks
1 (a) (i)	6	1	
(ii)	$\frac{1}{500}$	1	
(iii)	2.7	1	
(b)	9	1	
(c) (i)	3.5	2	B1 for 1.2 seen or division by 120 or M1 for $x + \frac{20x}{100} = 4.2$ oe
(ii)	Special promotion tin + working	2	M1 attempt at one rate
2 (a)	15 05 or 3 05 pm	2	B1 for (0)9 05 or (0)3 50 seen or M1 for 21 50 + 11 15 or 21 50 + 6
(b)	11 hours 55 minutes	2	B1 for (0)1 45 or 5 hours and 55 minutes seen or M1 for 13 40 – (0)7 45 + 6 oe
(c) (i)	290 (280 to 300)	1	
(ii)	45 or ft from their (c)(i)	1	
(d)	827	2	M1 for $683 + k \times 24$
3 (a) (i)	Correct quadratic graph through 11 points	3	B2 for curve through at least 8 ft points or for 11 ft points or B1 for 16 in the table twice or for 6 ft points
(ii)	– 2.35 to – 2.25 and 4.25 to 4.4	2ft	B1 for one correct solution or M1 for $y = 2$ drawn
(iii)	3.25 to 4.75	2	B1 for tangent drawn at $x = 3$ or for a gradient in range

(b)	2.54, – 3.54	3	Working seen and www B1 for $\sqrt{1^2 - 4 \times 1 \times (-9)}$ soi and B1 for $\frac{-1 \pm \sqrt{their37}}{2 \times 1}$ After B1 or B0 so far, M1 for both real values of <i>their</i> $\frac{p \pm \sqrt{q}}{r}$
(c)	$(y =) - 3x + 1$	2	B1 for $(y =) - 3x + c$ or $(y =)mx + 1$ or M1 for (i) theoretical or (ii) practical
4 (a)	$p = 12, q = 16$	2	B1 for one correct Or M1 for $k \times 5$ or $l \times 2.5$ where k and l are attempts to read from the histogram
(b) (i)	29.5	3	M1 for sum of the midvalues \times frequency and M1 for division by 60
(ii)	2070	2	M1 for attempt to use upper bounds of individual intervals
5 (a)	19.46 seen	4	Working seen. No wrong working. M2 for $14^2 + 8^2 - 2 \times 14 \times 8 \times \cos 122$ and A1 for 378.7 soi or M1 for an incorrect formula with one error and A1 for 141.3 or 319.35 or 250.7 soi
(b)	37.5 to 37.6	3	M2 for $\frac{14 \sin 122}{19.5}$ or M1 for $\frac{\sin B}{14} = \frac{\sin 122}{19.5}$ oe SC1 for correct method for wrong angle
(c)	247 to 248	4	M1 for $0.5 \times 8 \times 8 \times \sin C = 26$ oe soi and A1 for 54.34 and M1 for $180 - their 54.34$ or $238 - their 54.34$ SC1 after 0 for $CE = 8$
6 (a)	-1	1	
(b)	$\frac{x+7}{2}$	2	M1 for $x = 2y - 7$ soi or SC1 for the answer $\frac{y+7}{2}$
(c)	$g = 2.2$ or $2\frac{1}{5}$ or $\frac{11}{5}$	3	B1 for $2(3g) - 7 = g + 4$ soi and B1 for $mg = 11$ or $5g = n$ or SC1 after B0 for solving <i>their</i> linear $f(3g) = g + 4$

7	(a) (i)	$\frac{3}{4}$ or 0.75	1	
	(ii)	$(y =) - 4$	2	M1 for $4y - 6y - 3 = 5$ or correctly rearranges their linear equation
	(b)	$\frac{3w}{w+2}$ final answer	3	B1 for $15w(w - 2)$ and B1 for $5(w + 2)(w - 2)$
	(c) (i)	$p(p + 20)$ or $p^2 + 20p$	1	
	(ii)	Correct equation and the given form correctly derived.	2	M1 for $35(p^2 + 20p)$ and A1 for $35(p^2 + 20p) = 122500$ And the given form established.
	(iii) (a)	$p = 50$ and $p = -70$	2	M1 for $(p \pm h)(p \pm k)$ where $hk = 3500$
	(b)	70	1ft	Accept <i>their</i> positive $p + 20$
8	(a) (i)	112 to 116	1	
	(ii)	Perpendicular bisector of AB	1	
	(iii) (a)	Correct region shaded.	2	M1 for clearly identifiable arc centre B radius 8 cm
	(b)	2.9 to 3.1	1	
	(iv)	Yes as path of D passes through the shaded region	2	M1 for line from their D on a bearing 075
	(b) (i)	9.43	2	M1 for $(PR^2 =) 5^2 + 8^2$
	(ii)	6.38 to 6.39	3	M2 for $\sin 53 = \frac{x}{8}$ oe or B1 for correct triangle soi
9	(a)	-1	1	
	(b)	correct triangle	2	B1 for two vertices correct or for an incorrect reflection
	(c)	$x = -2.5$	1	
	(d)	4	1	
	(e)	Correct octagon	2	M1 for 6 correct vertices or octagon scale factor 2 incorrectly placed

(f) (i)	1575	2	B1 for any correct relevant area seen 2025 or 1125 or 112.5 seen or M1 for a complete, consistent, method
(ii)	30	1	
(iii)	10350	2ft	ft <i>their</i> $900 + 6 \times \text{their } 1575$ B1 for 450 seen or M1 for complete, consistent, method
10 (a) (i) (a)	$2x$	1	
(b)	$4x$	1	
(c)	$90 - 2x$ oe	1ft	
(ii)	19	3	M2 for $180 - 3x = 123$ oe or B1 for $\hat{B}E0 = (180 - 123)$
(b) (i)	22.3	2	M1 for $\frac{40}{360} \times \pi \times 8^2$
(ii)	476 to 477	4	M1 for $\frac{40}{360} \times \pi \times 16$ and M1 for $2 \times \text{their } 22.3$ and B1 for 8×20
11 (a) (i)	23 to 25	1	
(ii)	12 45 (pm)	1	
(iii)	1.9	1	
(iv) (a)	Straight lines to (14 45, 5.4) and from (14 45, 5.4) to (15 39, 0)	2	M1 for straight line $d = 5.4$ or straight line from <i>their</i> (14 45, 5.4) to (15 39, 0)
(b)	6 cao	1	
(b) (i)	Correct sectors and labels	2	M1 for sector of 30 or 150
(ii)	$\frac{5}{12}$ or 0.417 or 0.4166....	1	
(iii)	$\frac{41}{66}$ oe, 0.621	3	M2 for $1 - \frac{5}{12} \times \frac{4}{11} - \frac{6}{12} \times \frac{5}{11}$ oe or M1 for such as $\frac{5}{12} \times \frac{4}{11}$ or $\frac{6}{12} \times \frac{5}{11}$ After 0, SC1 for $(2) \times \frac{5}{12} \times \frac{6}{12} + (2) \times \frac{5}{12} \times \frac{1}{12} + (2) \times \frac{6}{12} \times \frac{1}{12}$